

Catherine M. Carpenter

Student at The Pennsylvania State University

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[Google Scholar](#) | [LinkedIn](#)

Education

Ph.D. Psychology

Expected May 2025

The Pennsylvania State University – University Park, PA

M. S. Psychology

May 2022

The Pennsylvania State University – University Park, PA

Thesis Title: *“Memory processes as we age: A dissociation of unitization, association and item memory over time”*

B.S. Psychology, Biology Minor

The Pennsylvania State University – University Park, PA

May 2020

Study Abroad

City, University of London, London, England

Study Abroad program, Spring 2019

Research Experience

Graduate Student

August 2020 - Present

Cognitive Aging and Neuroimaging Laboratory: *The Pennsylvania State University*

PI: Nancy Dennis

- Programming tasks in PsychoPy, using online interfaces such as Pavlovia and Prolific to collect data
- Writing and editing manuscripts
- Working with the IRB
- Scheduling and scanning fMRI participants on NIH grant
- Preprocessing in fMRIPrep and SPM12, univariate and multivariate analyses in SPM12
- Study design for NSF and R56 grant
- Programming and developing analyses for neuroimaging data in MATLAB, SPM12, FSL
- Overseeing a team of undergraduate research assistants
- Aids in recruitment events: tours, informational sessions
- Mentoring of undergraduate RAs
- Participant outreach: attends regular healthy aging series at local nursing homes

Co-Investigator

May 2018 - Present

*Elon University/Xavier University**PI: Amy Overman*

- fMRI scanning and analysis on NIH and R56 grant in collaboration
- RO1 & R56 grant for behavioral and neuroimaging project in collaboration

Co-Investigator

September 2022 - Present

*The Pennsylvania State University**PI: Frank Hillary*

- Breadth project on healthy aging, traumatic brain injury and resting state functional connectivity
- Developing skills in resting state network analysis

Undergraduate Research Assistant

December 2017 – August 2020

*Cognitive Aging and Neuroimaging Laboratory: The Pennsylvania State University**PI: Nancy Dennis*

- Administration of behavioral and neuroimaging tests to both younger and older adults
- Collection fMRI data in both older and younger adults
- Preprocessing and modeling of MRI data using SPM12 implemented in MATLAB
- Behavioral data analysis using SPSS
- Programming with E-Prime and MATLAB
- Managed research team of 3 to 5 undergraduate research assistants
- Worked on NIH funded grant in conjunction with a research team at Elon University
- Stimulus design
- Writing manuscripts
- Foundational lab duties: maintenance of participating database, calling and recruiting older adults, management of SONA

Peer-Reviewed Publications

Note: * indicates co-authors

- 1) Kurkela, K., **Carpenter, C. M.**, Babu, H., Chamberlain, J., & Dennis, N. A. (2021). [The effect of memory cue duration on performance in the directed forgetting paradigm in healthy aging.](#) *Aging, neuropsychology and cognition.*
- 2) Dennis, N. A., Overman, A. A., **Carpenter, C. M.**, and Gerver, C. R. (2022). [Understanding associative false memories in aging using multivoxel pattern analyses.](#) *Aging, Neuropsychology and Cognition.*
- 3) **Carpenter, C. M.**, Webb, C., Overman, A. A., & Dennis, N. A. (2022). [Contextual similarity negatively affects associative memory performance in both younger and older adults.](#) *Memory.*
- 4) *Ricuero, S., ***Carpenter, C. M.**, Steinkrauss, A., Gerver, C. R., Chamberlain, J. D., Overman, A. A. & Dennis, N. A. (2023). [Neural distinctiveness and reinstatement of hippocampal representations supports associative unitization.](#) *Brain Research*
- 5) **Carpenter, C. M.** & Dennis, N. A. (2023). Does unitization really function like items? [The role of time and interference on item and associative memory processes.](#) *Memory and Cognition.*
- 6) Steinkrauss, A. C., **Carpenter, C. M.**, Tarkenton, M. K., Overman, A. A. & Dennis, N. A. (2023). [Neural Distinctiveness and discriminability in core network representations support associative unitization.](#) *Aging Brain.*
- 7) **Carpenter, C. M.** & Dennis, N. A. (2024). [Neural similarity of schematic information overrides new information, irrespective of target or lure information.](#) *Memory: False Memory special issue.*
- 8) **Carpenter, C. M.***, Dennis, N. A.* & Becker, A. *. (2024) [Examining the neural basis of unitization: A review.](#) *Invited Cognitive, Affective & Behavioral Neuroscience Review.*
- 9) **Carpenter, C. M.**, Mullin, H. A., Cwiek, A., Carter, E., Vervoordt, S., Lan, G., Dennis, N. A., Rabinowitz, A., Venkatesan, U., & Hillary, F. G. Reproducibility of subcortical memory networks in healthy aging and after brain injury (*Under review at Brain Imaging & Behavior*).
- 10) Mullin, H. A., **Carpenter, C. M.**, Cwiek, A., Lan, G., Chase, S. O., Carter, E., Vervoordt, S., Rabinowitz, A., Venkatesan, U., & Hillary, F. G. Reproducibility of resting-state functional connectivity: a mini-multiverse analysis (*Under review at Imaging Neuroscience*).
- 11) Dennis, N., Overman, A., **Carpenter, C. M.**, Becker, A., West, J. T., & Chase, S. The Otter and the Cleaver: Exploring the neural underpinnings of unitization using the Gestalt principle of proximity (*Under review at JOCN*).

Chapters

- 12) Dennis, N. A., Chamberlain, J. D., & **Carpenter, C. M.** Chapter: 10 False memories. *SAGE handbook of cognitive and systems neuroscience*. (2023).

In Prep Publications:

- 1) Steinkrauss, A. C., **Carpenter, C. M.**, Overman, A. A. & Dennis, N. A. Logical orientation and proximity work together to promote associative memory in older adults.
- 2) **Carpenter, C. M.***, Brunswick, C.*, Kwapis, J. & Dennis, N. A. Cross species review of adaptive and maladaptive memory updating.

Pre-prints

- 1) [Dennis, N., Overman, A., Carpenter, C. M., Becker, A., West, J. T., & Chase, S.](#) (2024, July 23). The Otter and the Cleaver: Exploring the neural underpinnings of unitization using the Gestalt principle of proximity.
- 2) [Dennis, N.*, Carpenter, C. M.*, & Becker, A.*](#) (2023, September 21). Examining the neural basis of unitization: A review.
- 3) [Steinkrauss, A. C., Carpenter, C. M., Tarkenton, M. K., Overman, A. A. & Dennis, N. A.](#) (2023, May 16). Neural Distinctiveness and discriminability in core network representations support associative unitization. *Accepted at Aging Brain*.
- 4) [Dennis, N., Chamberlain, J., & Carpenter, C. M.](#) (2022, August 31). False Memories: What Neuroimaging Tells Us About How We Mis-remember the Past.
- 5) [Carpenter, C. M., Webb, C., Overman, A. A., & Dennis, N.](#) (2022, February 24). Within-category similarity negatively affects associative memory performance in both younger and older adults. Now published at *Memory*.
- 6) [Carpenter, C. M., & Dennis, N.](#) (2022, June 14). Does unitization really function like items? The role of time and interference on item and associative memory processes. Now published at *Memory and Cognition*.
- 7) Dennis, N. A., Overman, A. A., Carpenter, C. M., & Gerver, C. R. (2021). Understanding associative false memories in aging using multivariate analyses. *bioRxiv*, 2021-07. Now published in *Aging, Neuropsychology, and Cognition*.

Pre-Registrations

- 1) Carpenter, C. M., & Dennis, N. (2023, November 2). Retrieval, Aging and Unitization. <https://doi.org/10.17605/OSF.IO/HS642>
- 2) Carpenter, C. M., & Dennis, N. A. (2022, March 25). Similarity of neural representations of schematic targets and lures predict memory performance at retrieval in older adults. <https://doi.org/10.17605/OSF.IO/MTD8R>

- 3) Dennis, N.A., Steinkraus, A. C., Carpenter, C.M., Chamberlain, J. D. Understanding the contributions of individual differences to domain-general and domain-specific components of false memories in both young and older adults. ([OSF preregistration](#)).
- 4) Dennis, N. A., Overman, A. A., Levy, A., Becker, A., Carpenter, C. M. (2022, November 3). Understanding the neural mechanisms underlying the benefits of unitization on associative memory in younger and older adults. <https://osf.io/hyztpt>
- 5) Carpenter, C. M., Mullin, H., Cwiek, A., Carter, E., Vervoordt, S., Lan, G., ... Hillary, F. (2023, August 1). Reproducibility of subcortical memory networks in healthy aging and after brain injury. <https://doi.org/10.17605/OSF.IO/5KX9W>

Posters

- 13) **Carpenter, C. M.** & Dennis., N. A. (November 2024). Putting Unitization to the Test: An investigation into retrieval paradigm on the mechanism underlying unitization as we age. To be presented at Psychonomics 2024.
- 12) Tovar, M., **Carpenter, C. M.**, & Dennis, N.A. (April 17, 2024). Memory for Unitized Pairs in a Free Recall Task. Poster presented at the Pennsylvania State University Undergraduate Research Exhibition.
- 11) **Carpenter, C. M.**, Becker, A., Chase, S., West, J., Overman., A.A., & Dennis, N. A. (April 12-16, 2024). Neural similarity of schematic information overrides new information, irrespective of target or lure information. Poster presented at Cognitive Neuroscience Society 2024.
- 10) **Carpenter, C. M.** & Dennis, N. A. (March 2023). Neural similarity of schematic information overrides new information, irrespective of target or lure information. Poster to be presented at Cognitive Neuroscience Society 2023.
- 9) Steinkrauss, A. C., **Carpenter, C. M.**, Overman, A. A., & Dennis., N. A. (November 2022). Unitization Paradigm using Gestalt Principles Enhances Memory Recognition in Aging. Presented at Psychonomics 2022.
- 8) **Carpenter, C. M.**, Thomas., A. & Dennis, N. A. (March 2022). Memory supports as we age: How unitization functions over time and interference in younger and older adults. Poster presented at Cognitive Aging Conference 2022.
- 7) **Carpenter, C. M.**, Gerver, C. R., Overman, A. A. & Dennis, N. A (March 2021). Age-Related increases in associative false alarms: A representational similarity analysis of hits and misses at retrieval. Poster presented at Cognitive Neuroscience Society 2021.
- 6) Gerver, C. R., Overman, A. A., **Carpenter, C. M.**, Cowan, J., Jenkins, C. & Dennis, N. A (March 2021). Encoding-retrieval congruency affects the neural processing of associative

recollection in young and older adults. Poster presented at the Cognitive Neuroscience Society 2021.

5) **Carpenter, C.** & Babu, H. (2020, April 9). The effect of memory cue duration on directed forgetting performance in healthy aging. Psi Chi Undergraduate Research Conference, State College, PA, United States (Conference cancelled due to COVID-19).

4) Babu, H. & **Carpenter, C.** (2020, April 9). Contextual interference negatively impacts associative memory across age. Psi Chi Undergraduate Research Conference, State College, PA, United States (Conference cancelled due to COVID-19).

3) **Carpenter, C.**, Babu, H., Kurkela, K., & Dennis, N. A. (2020). The effect of memory cue duration on directed forgetting performance in healthy aging. Poster to be presented at the Cognitive Aging Conference (Conference cancelled due to COVID-19)

2) Babu, H., **Carpenter, C.**, Webb, C., Overman, A., Dennis, N. A. (2020). Contextual interference negatively impacts associative memory across age. Poster to be presented at the Cognitive Aging Conference (Conference cancelled due to COVID-19)

1) Chamberlain, J., Hultman, C., Martinez, V., **Carpenter, C.**, Overman, A., Dennis, N. A. (2019). Configuration manipulation impacts neural patterns in medial temporal lobe in associative memory retrieval. Poster presented at the Cognitive Neuroscience Annual Meeting.

Grants & Awards

T32 NIH Aging Pathways Predoctoral Fellow

2023 - 2025

- Primary Advisor: Nancy Dennis
- Secondary Advisor: Janine Kwapis
- 2-year research fellowship integrating aging research from a psychological and biological perspective

*University of Utah's Advanced Statistical Methods in Neuroimaging
& Genetics Course Fellowship*

2023

Mona Bird Shipley Memorial Scholarship – Honorable Mention

2019

Costello Family Memorial Scholarship in Psychology

2019

Liberal Arts Enrichment Funding

SU 2019 – FA 2019

Dean's List

FA 2017 – SP 2020

Teaching Experience – The Pennsylvania State University

Teaching Assistant

Psych 490 – Debunking Myths about the Brain	FA 2020 & FA 2021
Psych 452 – Learning and Memory	FA 2020, 2022 & SP 2021
Psych 490 – False Memories	FA 2021
Psych 452 – Learning and Memory	FA 2022
Psych 490 – Happy and Healthy Brain	FA 2022
Psych 478 – Clinical Neuropsychology	SP 2023

Professional Memberships

- Cognitive Neuroscience Society 2020-current
- Psychonomic Society 2022-current
- Gerontological Society of America 2024-current

Leadership and Involvement

The Pennsylvania State University

- **Cognitive Area Graduate Liaison** 2022-2024
- **Participants Across the Lifespan Database Graduate Coordinator** 2022-current
- **Invited Guest Panelist** Fall 2022
 - Undergraduate Research Involvement talk
- **Invited Guest Talk – Associative Memory and Aging** Fall 2022
- **Invited Guest Talk – Multivariate Neuroimaging Analyses** Fall 2023
- **Invited Guest Talk – Penn State Aging Research & Training Colloquium** Spring 2024

Ad Hoc Reviewer

Memory

Psychological Research

Learning and Memory

Cognitive, Affective and Behavioral Neuroscience

Memory & Cognition

Software Proficiencies

MATLAB, R, Linux, CONN Toolbox, PsychoPy, Qualtrics, SPM12, FSL, fMRIPrep, Microsoft Programs, E-Prime, SPSS, Pavlovica and Prolific